Positive efficiency findings using computer assisted ICD-encoding: 3,5 years of experience with the computerized patient record system PADS (Patient Archiving & Documentation System)

J.H. Hohnloser, University of Munich, Germany
H. Soltanian, University of Homburg-Saar, Germany

In daily routine there is a major discrepancy between what physicians do and what they document. From a medical information processing point of view amongst the more important functions physicians perform in their daily routine is the encoding of diagnoses using a standard vocabulary such as ICD-9. This paper presents evidence that through the use of the ICD-encoding module of a computerized patient record system (PADS, Patient Archiving and Documentation System) user compliance can be improved. "Bypassing" mechanisms can be partly reversed (up to 43 %), more coded diagnoses are documented (by 51 %) and those diagnoses documented are more complete (increase by 57 %).

INTRODUCTION

A computerized patient record system (PADS (Patient Archiving and Documentation System)) was developed at the University of Munich and used in ICU and CCU of one University of Munich medical hospital [1]. Amongst the systems' function is database management of automatic ICD-encoding.

This report we will focus on experiences the PADS ICD-encoding module and will present data to illustrate positive effects through system use.

MATERIAL AND METHODS

In our hospital before 1985 (phase I) no diagnoses were encoded. After 1985 (phase II) a German clinical modification of ICD-9 ("Lübecker Schlüssel") was used [2]. Doctors had to manually encode each diagnosis listed in the discharge summary. The discharge summary - amongst other sections - consists of diagnoses header, medical history and conclusion/summary. Diagnoses listed in the diagnosis header section of the discharge summary must be encoded using ICD-9. Frequently, those diagnosis were mentioned either in the medical history section or the conclusion/summary section.

After 1990 (phase III) diagnoses were encoded using the same ICD code but a semiautomatic computerized technique implemented as part of the computerized patient record system PADS was used instead of the manual encoding process.

In the analysis presented we compare the three phases: Pre ICD, Post ICD/Pre PADS and Post ICD/Post PADS. We analyzed the following parameters:

a) Total number of (free text) diagnoses in the discharge summary
b) Total number of ICD-encoded diagnoses in the discharge summary
c) Number of (free text) diagnoses in the medical history section
d) Number of (free text) diagnoses in the conclusion/summary section

The basis of this analysis for phase I and phase II were 200 traditional discharge summaries of ICU/CCU patients. This analysis was done manually. For phase III we analyzed 3153 admissions on ICU/CCU of 2792 patients between 1/90 and 6/93 with the help of a computer. In these patients 10414 ICD diagnoses were automatically encoded using PADS. Data were then jointly analyzed using PC based spreadsheet and statistics applications.

RESULTS

a) The mean number (± SE) of free text diagnoses per admission for phases I, II and III respectively were 3.2 ± 0.73, 3.64 ± 0.33 and 3.34 ± 0.3, respectively (difference not significant).

b) The mean number of ICD-encoded diagnoses (0 in phase I) rose from 1.8 ± 0.31 (phase II) to 2.72 ± 0.24, a 51 % significant increase after installation of the computerized patient record system (see figure 1).

c.) The mean number of free text diagnoses in the medical history section rose from 0.5 ± 0.2 (phase I) over 0.92 ± 0.31 (phase II) to 1.0 ± 0.18 (phase III), a 84 % significant ($p < 0.001$) increase in free text diagnoses in the medical history section following the introduction of ICD-9 CM, which did was not reversed after the introduction of PADS.

d.) The mean number of free text diagnoses in the conclusion/summary section rose from 0 (phase I) over 0.81 ± 0.19 (phase II) and declined after installation of PADS to 0.45 ± 0.12, a 43 % significant ($p < 0.001$) reduction of diagnoses inappropriately escaping ICD-encoding.

e.) every single diagnosis encoded using the PADS ICD-encoder will allow only 100% encoding ("all or nothing" principle in phase III) as opposed to 46 % completeness in phase II thus assuring completeness of coding.

CONCLUSION

Our data indicate that
- only 50 % of all (free text) diagnoses are encoded manually using ICD-9 CM

0195-4210/94/$5.00

documented data and even reverse "bypass" mechanisms developed by users to escape data coding.

LITERATURE

1. Hohnloser, J.H., Pürner, F. (1992) PADS (Patient Archiving and Documentation System): A computerized patient pecord with educational aspects. International Journal of Clinical Monitoring and Computing 9:71-84

2. Mansky T, Scriba PC, Fassl H, Friedrich HJ. [Diagnosis encoding: how and to what purpose? (editorial)]. Dtsch Med Wochenschr 1986;111(45):1707-8.